UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

November 29, 2000

Mr. Harold Reid
March AFBCA/DD
3430 Bundy Ave., Bldg. 3408
March AFB, CA 92518-1504

Re: **Draft Five-Year Review Report, OUs 1, 2, & 3 dated October 2000**

Dear Mr Reid,

This letter provides EPA's preliminary comments on the subject document. Regretfully, EPA cannot concur with the Air Force's (AF) review that "remedies selected for OU1 & 3 are protective of human health and environment." OU1 presents the biggest risk concern to EPA. With OU1's plume still not completely defined, the AF's statement of its remedy being protective is erroneously premature. OU1's pump and treat system continues to promote TCE migration from the upper to the lower aquifer, therefore, the AF is not complying with the ROD or pertinent ARARs (Safe Drinking Water Act). As examples, the AF is not effectively reducing the TCE contamination to below MCL of 5 ppb (upper aquifer's highest TCE concentrations have increased from 400 to 1200 ppb), or eliminating the potential for TCE plume groundwater migration (all 15 of AF's modeling scenarios and the current water discharge point promote TCE migration into the lower regional drinking aquifer).

EPA has attached a list of technical concerns to provide a more meaningful 5-Year Review process, but it should be addressed by all BCT members. Accordingly, we suggest using the list for the agenda items at the December 5-6 technical meeting. EPA will provide final comments upon understanding GAFB's approach for the attached concerns as many of them should be considered in the 5-Year Review effort. If you have any questions, please call me at (415) 744-2158.

Sincerely,

James Chang
Remedial Project Manager

Attachment

cc:
Mike Miller/HG
Sue Tiffany/MW
Mike Plaziak/RWQCB

MEMORANDUM

TECHLAW, INC.
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To: James Chang, George Work Assignment Manager
From: Indira Balkissoon, TechLaw
Date: January 3, 2020; 8:05 AM
Subject: Remedy Optimization List, George Air Force Base

This list is intended to assist the Air Force in prioritizing site activities. Though it is intended to be inclusive it does not relieve the Air Force of its responsibility to continue to identify and address additional remedy optimization opportunities not included in this list.

OU 1

1. Implement active measures to stop TCE mass movement to lower aquifer including halting injection of treated effluent into the percolation ponds and discharging to another location.
2. Focus on removing TCE mass at hot spots.
3. Protect human health and the environment by removing the risk of increased TCE mass entering the lower aquifer which serves as a drinking water source and is in communication with the Mojave River.
4. Meet the ROD objective of removing mass and containing contamination from the upper aquifer.
5. Meet the ROD objective of removing mass and containing contamination for the lower aquifer.
6. Consider each aquifer separately in meeting the ROD objectives.
7. Clarify the character of the upper and lower aquifers.
8. System optimization for the groundwater extraction system should consider the following:
    a. Stop injecting treated groundwater to the upper aquifer via percolation ponds and discharge to the golf course or another appropriate location.
    b. Install groundwater extraction systems for all of the three plumes in the upper aquifer located at NZ 39, NZ 40, and NZ 55.
    c. Focused remediation in each of the three upper aquifer plumes to prevent TCE mass in upper aquifer from reaching the lower aquifer.
    d. Focused remediation in the lower aquifer to contain TCE and reinject treated effluent from the lower aquifer back into the lower aquifer.

e. Mitigation and monitoring to address TCE migration from the upper aquifer to the lower aquifer via vertical flow, arroyo channels and faults.
f. Focused remediation of the NZ-55 hot spot and installation of a downgradient monitoring well in the lower aquifer to monitor plume migration in the vicinity of NZ 55.
g. Down gradient monitoring of the three plumes within migration pathways considering vertical flow, arroyo channels, faults and percolation pond groundwater movement.
h. Evaluate all lower aquifer groundwater to ensure that groundwater with significantly low concentrations of TCE is not extracted except for hydraulic containment purposes.
i. Demonstrate that the screened intervals in the extraction wells are designed to intercept the apparent plume migration routes for all monitoring and extraction wells.
j. Continue quarterly monitoring of the focused lower aquifer monitoring well network and provide quarterly presentation and analysis of the results.
k. Incorporate the data and analysis of the quarterly monitoring of the focused lower aquifer monitoring well network into the basewide groundwater monitoring reports.

9. Consider enhancements to improve aqueous phase capture and sorbed TCE such as dual phase extraction, more extraction wells etc.

10. Migration to the lower aquifer via vertical flow, migration via arroyo channels, migration via faults and migration via percolation pond groundwater movement.

11. Optimization hydro-geologic modeling consider the following:
    a. The upper aquifer and lower aquifer separately.
    b. Consider the objectives for each aquifer to be both mass removal and containment as specified by the ROD.
    c. Achieve greater than 70% mass removal in the upper aquifer over the remaining 21 years of planned system operation.

12. Calculate the amount of water extracted from each aquifer per pound of TCE mass removed.

OU 2

JP-4 Plume

13. Conduct additional free product plume characterization. Additional wells are needed in the following areas to define the extent of the JP-4 plume, 1) between

EX-7 and MW-24; 2) between EX-6 and MW-25; and 3) between EX-6 and EX-5.

14. Present good cross sections that contain lithologic, well construction, and contaminant distribution data. The cross sections should also contain the groundwater levels, to show that the screen intervals of the monitoring wells are located appropriately. The cross sections should be used to define the vertical extent of contamination and to identify possible deposits where JP-4 may be migrating. The cross sections can also be used to help identify the locations of the data gap wells.

15. Complete Feasibility Study (FS) for JP-4 plume. The FS should include:
    a. Demonstrate that horizontal and vertical extent of contamination has been defined.
    b. Identify potential source areas.
    c. Recalculation of JP-4 mass remaining.
    d. Update of site conceptual model. Include fate and transport model of the JP-4 in groundwater.
    e. Source removal has to be a key component of the FS. Without adequate source removal, natural attenuation will not be an accepted remedy for groundwater.
    f. Evaluate complementing technologies to remove petroleum hydrocarbons contamination from groundwater, capillary fringe, and rest of the vadose zone.
    g. Submit SVE Pilot Study Report.
    h. Submit plans for SVE system expansion.
    i. Address LNAPL above well screens found in IT monitoring well videos.

OT-69

16. It has not been determined that monitoring data supports the OU 3 remedy for natural attenuation in 40 to 45 years.
17. Increased sampling of monitoring wells based on increasing TCE concentrations. These wells include MW-60, MW-49, MW-72, MW-41, MW-43, MW-28, MW-29, and MW-30.
18. Evaluation of increasing TCE concentrations in groundwater. Compare concentrations to the predicted concentrations presented in Appendix B of the OU3 Record of Decision.
19. Evaluate the need for the contingency remedial action (in situ air stripping/soil vapor extraction) to be implemented at OT-69.

FT- 20

20. Develop/update site conceptual model
21. To adequately characterize the TCE plume before the High Desert Power Plant

(HDPP) is constructed the Air Force should:

a. Provide the RPM's management and analysis information such as recommendations on managing and monitoring the TCE plume to assist in decision making for the property transfer to the HDPP.
b. Design a plan to assist property transfer which includes information describing access and coordination with the HDPP for groundwater monitoring, maintenance and construction of remedial systems within the foot print of the HDPP.
c. Plan to address and control migration of TCE in groundwater which exceeds the MCL at the HGL-2 Temp within the footprint of the HDPP.
d. Fill the data gap regarding the potential impact of the FT 20 plume on the lower aquifer.
e. Fill the data gap of delineating the areal extent of TCE to the east and south of the FT-20 TCE plume.
f. A groundwater monitoring well is needed in the lower aquifer in the drainage between NZ 80 and NZ 60.
g. It has not been determined that monitoring data supports the OU 3 remedy for natural attenuation in 40 to 45 years.

22. Show why the TCE plume has shifted and why the groundwater flow direction is east and the gradient is steeper at the HDPP location rather than northeast as expected based on regional groundwater flow.

Dieldrin Investigation

23. Submit report of investigation results.
24. Conduct soil sampling and evaluate dieldrin presence at suspect locations (e.g, housing, mixing, and rinsate areas, etc.).

OU 3

WP-17 and FT-19a

25. Provide sample results from soil borings, soil gas monitoring points and other lines of evidence that the remedial systems have been effective.
26. Soil gas monitoring wells are needed to verify that the areal extent of constituents of concern have been reduced rather than pushed outside of monitoring locations by the bioventing.
27. Provide a cross-section of the current interpretation of the vertical extent of TPH contamination at Sites WP-17 and FT-19a to assist in interpretation of confirmation sampling results.

Landfills

28. New background monitoring wells need to be installed at landfills DP-03, DP-04, LF-12, and LF-14.

29. An additional monitoring well is needed at LF-12 to determine the groundwater flow direction.
30. New compliance wells are needed for landfills DP-03 and DP-04.
31. The list of contaminants of concern at the landfill sites DP-03, DP-04, LF-14 and SEDA may need to be revised to incorporate contaminants detected during the RI:
    - Lead, SVOCs, and TPH at DP-03
    - Lead, nickel, mercury, zinc, TPH, and pesticides at DP-04
    - Chrysene, pyrene, TPH, VOCs, and pesticides at LF-14
    - VOCs, TPH, and pesticides at the Southeast Disposal Area (SEDA)
32. Update Water Quality Protection Standards based on new monitoring wells.
33. Outstanding landfill documents that must be submitted include, Closure/Post Closure Maintenance Plan and the Operation and Maintenance Manual.
34. Additional cap erosion prevention measures must be implemented at LF-14.

OT-51

35. Based on results of the Praxis PneuLog study, additional soil vapor monitoring points are needed to ensure that extent of contamination is defined and to evaluate the effectiveness of the extraction system. Additional monitoring points are needed to the north of BV-5, and to the southeast and southwest of PEW1.
36. Recalculation of mass remaining is required.
37. Graphs of TPH concentrations in soil vapor, before and after the startup of the SVE system are required.
38. Optimization of the SVE/bioventing system is required.

FT-19c

39. Report concentrations of TCE at individual extraction wells and at soil vapor monitoring points.
40. Optimize the SVE system to focus on areas with the most TCE mass remaining.
41. Improve the online time for the SVE system.

Additional Suggestions:

42. Has or are there plans to use the September 18, 2000 Lawrence Livermore National Laboratory information regarding “Cost-Effective Sampling Analyses of the George Air Force Base Site Ground Water Analytical Data” into the Basewide Monitoring Program?
43. Air Force needs to address U.S. EPA’s comments on the Performance Monitoring Report for the Third Quarter 2000.
44. Continue operation and maintenance of the OU1 extraction and treatment system. Evaluate ways to improve the online time of the extraction portion of the system.

45. Include a discussion of points of compliance for all groundwater plumes in both the Montgomery Watson and Hydrogeologic groundwater monitoring reports.
46. Semi Annual Report for Remedial Activities at FT-19a/c, OT-51, & Landfill Sites. Collect and analyze soil gas data for TPH, O_2 & CO_2 at FT-19a/c, OT-51. For FT-19c, must consider system downtime when calculating TCE mass removal,

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